PRICE 15¢

DEC 27 1937

SCIENCE NEWS LETTER

PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

THE WEEKLY SUMMARY OF CURRENT SCIENCE•

December 18, 1937

Infinite Variety

See Page 394

A SCIENCE SERVICE PUBLICATION

Do You Know?

The cream in goat milk does not rise, but it can be separated mechanically.

Over half of the two-year-old children seen at one dental clinic had decaying teeth.

Europe is now trying silk-soap, a product containing five per cent. of low grade silk waste.

The United States last year imported 20 million dollars worth of products from China and 13 million from Japan.

An undersea bank only 20 fathoms under water has been discovered near Cuba, where previous charts had shown a depth of 1,000 fathoms.

Despite a popular idea that California's Big Trees thrive only in that corner of the world, such trees have been successfully planted in Switzerland and a number of other countries.

It is considered wasteful to burn brush in farm woodland, because the piles provide good refuges for birds and small game; and because the twigs and branches eventually decay to give back needed humus to the soil.

According to a recent traffic survey, 18-foot roads are too narrow for modern traffic, 20-foot roads are too narrow for a road frequented by many wide trucks, whereas 22-foot roads are quite adequate for modern mixed traffic.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

ANTHROPOLOGY

Is primitive art childlike? page 387.

Who was the first human being ever to walk the earth? page 387.

AGRICULTURE

How have the Rust brothers improved their cotton picker? page 397.

ARCHAEOLOGY

Why do scientists think that Jacob was an adopted son? page 393.

BOTANY-PHYSICS

How are living leaves to be made to light the New York World's Fair? page 393.

CHEMISTRY

Can soap be made from coal? page 391.

How have housewives been saved from onion-peeling tears? page 392.

How is combustible phosphorus made on a large scale? page 397.

CHRONOLOGY

How was the date of Christmas set? page 399.

CONSERVATION

What is the favorite grain of game animals? page 393.

DENTISTRY

Can pyorrhea be prevented? page 390.

Should a person go to bed after a tooth extraction? page 390.

What is the connection between wisdom teeth and cancer? page 390.

ECOLOGY

Can palm trees sway in snowy climates? page 389.

GEOLOGY

What old form of animal life was found in Grand Canyon? page 391.

MEDICINE

Does the new swift cure for gonorrhea also remedy the complications? page 388.

METEOROLOGY

How do snowflakes form? page 394.

OPHTHALMOLOGY

How does the human eye change from far-sightedness to near-sightedness and back again? page 398.

PALEONTOLOGY

What creatures tramped near Gettysburg battlefield millions of years ago? page 392.

PHYSIOLOGY

Why does alcohol cause a hang-over? page 392.

PUBLIC HEALTH

Can vaccination prevent parrot fever? page 396.

What does the physician warn Santa Claus to avoid? page 388.

ZOOLOGY

Do elks like turkey? page 393.

How is the whale's brain adapted to meet whale conditions of life? page 389.

In 57 years, Alaska has yielded in minerals alone 100 times what the United States paid for it.

Sulphur was used 2,000 years before the Christian era by pagan priests in weird ceremonials, and also for practical use in bleaching linen and cotton.

Avalanches in the Alps may crash down the mountains with a speed of 120 miles an hour.

Tuberculosis is an important factor in poverty, because it attacks most often individuals between 20 and 50 years old, just when they are in the earning stage.

SCIENCE NEWS LETTER

Vol. 32 DECEMBER 18, 1937 *No. 871*

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. *Edited by* WATSON DAVIS.

Subscriptions—$5.00 a year; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Canadian subscribers please add 50 cents a year, foreign subscribers 75 cents a year for extra postage.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at the reduced price of $3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A.A.A.S., Smithsonian Institution Building, Washington, D.C.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

Copyright, 1937, by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserve, Washington.

Entered as second class matter at the postoffice at Washington, D. C., under the act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature and in the Engineering Index.

Advertising rates on application. Member Audit Bureau of Circulations.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

Board of Trustees—*Honorary President:* William E. Ritter, University of California. Representing the American Association for the Advancement of Science, J. McKeen Cattell, Editor, Science, Garrison, N. Y.; Henry B. Ward, University of Illinois, Urbana, Ill.; Edwin G. Conklin, *President*, American Philosophical Society, Philadelphia, Pa. Representing the National Academy of Sciences, W. H. Howell, *Vice-President* and *Chairman of Executive Committee*, Johns Hopkins University, Baltimore, Md.; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, Calif.; Harlow Shapley, Director, Harvard College Observatory, Cambridge, Mass. Representing National Research Council, Ludvig Hektoen, John McCormick Institute for Infectious Diseases, Chicago, Ill.; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry, Washington, D. C. Representing Journalistic Profession, John H. Finley, Editor, New York Times; Mark Sullivan, Writer, Washington, D. C.; Dean Carl W. Ackerman, Columbia University Graduate School of Journalism, New York City. Representing E. W. Scripps Estate, Harry L. Smithton, *Treasurer*, Cincinnati, Ohio; Robert P. Scripps, Scripps-Howard Newspapers, West Chester, Ohio; Warren S. Thompson, Miami University Oxford, Ohio.

Staff—Director, Watson Davis; Writers: Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, Robert Potter, Ronald L. Ives, Leonard Engel; Correspondents in principal cities and centers of research. Librarian: Minna Gill; Sales and Advertising: Hallie Jenkins, Austin Winant, Howard Bandy.

ANTHROPOLOGY

New-Found Fossils Prove Pithecanthropus Was Human

Lower Jawbone Containing Wisdom Tooth and Many Fragments of Skull Cap Identify as Oldest Man

EARLIEST human being that ever walked the earth.

This title is restored to the Ape-Man of Java, *Pithecanthropus erectus,* after years of doubt, by the discovery of a new skull, reported by Dr. John C. Merriam, president of the Carnegie Institution of Washington, to the Institution trustees. The discovery was made by Dr. G. H. R. von Koenigswald of Bandoeng, Java, a research associate of the Institution.

The new skull, hailed as one of the most sensational finds in the history of human evolution, was in more than forty pieces when it was picked out of its age-long resting-place in the ancient gravel beds and has not yet been fully patched together. However, Dr. von Koenigswald has determined that it is definitely human, a point hitherto considerably in doubt. Only last spring, the discoverer of the first skull, Dr. Eugene Dubois, declared his conversion to the opinion that the Ape-Man was an ape and not a man.

The new-found fossils consist of a lower jawbone and a much broken skull-cap. The jawbone still contains several teeth and the sockets from which others have fallen out. Of particular importance is the third lower molar, or wisdom tooth. This is very large, showing no trace of the reduction common in most human jaws, and is characterized by Dr. von Koenigswald as an ape-like feature. On the other hand, the socket of the eyetooth is small, therefore not ape-like. The wrinkling of the crowns of the molars is more complicated than in modern man but less than in Peking Man, and is more similar to that of Neanderthal Man.

Human Skull

The skull cap is definitely human in the position of the ear, and in the way the lower jaw was jointed to the skull, but lacks a well-developed mastoid process, and in this respect it is ape-like.

Summing up, Dr. von Koenigswald says, "By these new finds it can be definitely proved that *Pithecanthropus* is human."

The age of the Java Ape-Man, Dr. Merriam commented, is not as great as was supposed when Dr. Dubois discovered the first skull cap, more than forty years ago. Then, the fossils were stated to belong to the period before the Ice Age, and to have an antiquity of more than a million years. Recently discovered fossils of extinct animals in the same gravel beds indicate that *Pithecanthropus* existed some time near the middle of the Ice Age, and is therefore not much more than half the formerly supposed age.

Back of discovery is a romantic little story dating back to a Munich beer garden. Something over a dozen years ago, two young German graduate students at the University of Munich, about to get their Ph.D's in geology, were sipping their seidels of *Münchener Helles* (or maybe it was *Dunkles*). Half-jocularly, they divided the world between them, for their scientific conquest.

One of them, Hellmut de Terra, now on the Yale faculty, told the other, "Your job is to go to Java and find another *Pithecanthropus* skull." To which his companion gravely agreed.

Dream Came True

Unlike many such student daydreams, however, this one actually came true. For the second student was G. H. R. von Koenigswald, discoverer of the second skull and jawbone of this most ancient and primitive of human beings.

Dr. von Koenigswald didn't have an easy time of his search for the Ape-Man. He went to Java all right, but to make a living had to take a job as an economic geologist which allowed him no time for *Pithecanthropus*-hunting. Finally, however, the Carnegie Institution provided funds and gave him the status of Research Associate. That happened just last March.

By August, Dr. von Koenigswald turned in his Ape-Man skull fragments.

In the meantime, the original *Pithecanthropus,* discovered in the 1890's by Dr. Eugene Dubois, has lost some of his property. The teeth found in the same layer of river gravel with the first skull cap, and presumed to belong to the Ape-Man, have been definitely proved to be those of an extinct species of orang-utan. And the thighbone, with its peculiar diseased outgrowth, is now believed to be probably the remains of a different, more advanced, type of human being.

Science News Letter, December 18, 1937

ARCHAEOLOGY

White Man's Funny, Too—As Natives See Him

FOR years, white men have been staring at natives and making frank remarks about how funny they are.

But the tables have been turned. If you can take it, you can see how funny white men look to the natives.

Prof. Julius E. Lips, one of Germany's exiled scholars, has come to this country, and published a book in which he shows and explains a rare collection of such pictures. (THE SAVAGE HITS BACK —Julius E. Lips—*Yale Univ.,* 254 p., illus., $5.)

He shows you, for example, Queen Victoria carved in wood by various African subjects, and you observe she is generally a puffy-cheeked, stout lady with trailing veil and a sawed-off body. Why? Because the Empire's African subjects

QUEEN VICTORIA

As her native African subjects depicted her.

knew the Queen from pictures, particularly one famous half-length portrait. It left them uncertain whether she had feet like an ordinary woman.

Likewise, the German Emperor, whom one wood carver portrayed with proudly lifted head and outflung chest—and his legs attached backward.

To understand primitive art, always think of it in relation to the artist and his cultural background. This is emphasized by Prof. Lips.

Primitive art is not childlike, he finds. Nor is it similar to the art of the insane. In its own way, it is adult and healthy, and often shrewd. One South Sea islander carved an Englishman in precisely our comedy fashion, with one glassed eye, gaping mouth with buck teeth, blank look, all complete. To the islanders, the image was a bogy for warding off spirits. But whether intended to be funny or frightening, the point is the native caught a penetrating portrait.

Prof. Lips' wide array of this art leaves no doubt that the so-called simpler peoples of earth have taken the white man's measure, often. The German anthropologist believes we can learn about ourselves, as well as about the natives, from studying them.

Science News Letter, December 18, 1937

MEDICINE

Gonorrhea Cured In 3 Days By Sulfanilamide Treatment

In 830 Cases Treated, Not a Single Complication Occurred Although Usually They Are Common

CASES of gonorrhea cured within three days by sulfanilamide were reported by Prof. E. P. Alyea of Duke University School of Medicine at the meeting of the Southern Medical Association. Prof. Alyea treated 158 patients with this new potent drug and four-fifths of them made these rapid recoveries.

A striking feature of this new treatment for gonorrhea is that the complications of the disease, which may cause untold pain and suffering, have almost disappeared.

"We are not seeing one-fifth as many complications in the dispensary because of the general acceptance of the drug for the treatment of gonorrhea," Prof. Alyea said.

Out of 1,000 cases treated by the generally accepted method of a few years ago, nearly half had complications. Sulfanilamide was only introduced into American medicine a year ago and so far 830 cases of gonorrhea treated with it have been reported in scientific journals. In these 830 cases not a single complication of gonorrhea has been reported. Prof. Alyea called this "a most striking result."

Patients who came to the Duke dispensary with gonorrheal complications such as arthritis, prostatitis and urinary tract ailments, were also treated with sulfanilamide. At least half of these patients recovered and others were improved.

A new drug, di-sulfanilamide, cured one patient after long treatment with large doses of sulfanilamide had failed to help him. The new drug, closely related to sulfanilamide, is being studied further.

Because serious complications may result from sulfanilamide treatment, Prof. Alyea stated that patients given this treatment should be constantly under the care of a physician. White blood cell counts and hemoglobin determinations should be made every other day so that the first sign of dangerous blood changes can be caught.

Science News Letter, December 18, 1937

GEOLOGY

Man Discovered America In Ice Age, Is Verdict

THE MOST baffling question in America's prehistory—whether man discovered this continent as early as the Ice Age—is at last definitely answered by geologists: Yes.

Man was here in extreme northern Colorado "some thousands of years ago while glaciers still lingered in the mountains and when the climate was somewhat wetter and colder than now," is the verdict of two Harvard geologists, Prof. Kirk Bryan and Louis L. Ray.

Humans who endured that chilly and damp climate were the famous Folsom hunters, whose peculiar stone weapons have been discovered by archaeologists in many parts of the United States. The extinct glaciers, whose deposits were studied by the Harvard geologists, advanced and retreated over a region in northeastern Colorado near where Folsom Man's only known campground and workshop lie. This camp is the extraordinary archaeological site excavated by Frank H. H. Roberts, Jr., of the Smithsonian Institution.

Scientists have hotly debated whether Folsom Man hunted the mammoth and an extinct form of bison, which were Ice Age mammals, during the Ice Age itself, or whether some of these beasts survived their era and were hunted at a comparatively recent date by Folsom Men, who might have just arrived on the continent.

The two geologists now say that Folsom Man's stone tools and weapons in Colorado can be linked with glacial deposits laid down when the most recent ice sheet had passed its climax and was retreating. This most recent glacial retreat in North America, according to geologists, began about 20,000 years ago, but the process was uneven, and in the eastern foothills of the Colorado Rockies, 5,000 feet above sea level, it may have started a few thousand years later.

Science News Letter, December 18, 1937

PUBLIC HEALTH

Don'ts for Santa Claus On Children's Toys

WHEN Santa Claus fills his toysack before his annual trip to the homes of all good little children, there are a number of do's and don'ts that doctors, psychologists and safety experts wish he would remember.

High on the Do Not Give list are shooting games, pop-guns, air rifles or so-called BB guns and other firearms. Aside from the hazard to life from the deadly firearms, there is great danger of blindness from the so-called safe air rifles and shooting games. They are only safe in the hands of an older boy who appreciates their danger and uses them carefully.

Dangerous also are lead soldiers, whistles and other toys small enough to be put into the mouth. All too often such toys are accidentally swallowed or sucked back into the throat and air passages, and unless they can be dislodged they may be the cause of a child's choking to death. The bronchoscope has enabled surgeons to save many children from this fate, but it is not always possible

to get the child to the surgeon quickly enough.

Toys with poor paint, sharp edges, fragile materials, rough surfaces and sharp corners also belong on the don't list.

Psychologists agree that children's toys should be simple. The elaborate ones that tempt Santa's grown-up aides might as well be put on the don't give list because the children will not enjoy them anyway.

When Santa stops at a sick child's bedside, he needs to have a supply of lightweight toys and small books with plenty of pictures and large type. If the sick child is in a hospital or has some contagious sickness, his toys should be cleanable. Woolly dogs and stuffed animals and dolls are examples of the non-cleanable type that are not too welcome in a hospital and may have to be heartlessly discarded when the small patient gets well.

Science News Letter, December 18, 1937

ZOOLOGY

Whales' Brains Are Adapted To the Whale Way of Life

BRAINS of whales and their cranial nerves show structures remarkably adapted to the conditions and necessities of their aquatic lives, report Drs. Ferd A. Ries and Orthello R. Langworthy of the Johns Hopkins University, who have had opportunity to study the cranial anatomy of these sea giants. (*Journal of Comparative Neurology.*)

Whales appear to have little or no sense of smell, and the olfactory center in the brain is correspondingly undeveloped. In the sperm whale it persists in merely rudimentary form.

Whales' ears, on the contrary, are highly developed, and the brain and nervous structures having to do with hearing and the sense of balance (another ear function, especially important to swimming animals) are conspicuous and highly specialized. The acoustic nerve is the largest of the cranial nerves. The organs of hearing are modified to perceive stimuli moving through water instead of air.

The facial and trigeminal nerves, which humans notice only when they "act up" in neuralgia, are of great importance to whales. They control the blowhole lining and musculature of the blowtube, without which of course no whale can operate.

Science News Letter, December 18, 1937

A lion's mane protects its throat when it meets another lion in combat.

TO LEAVE HOME

Within sight of snow in the Andes Mountains of South America grow these 200-foot-tall wax palms. Found as high as 13,000 feet above the sea level, these hardy trees may some day grace parks of Pacific Coast cities.

ECOLOGY

Cold No Terror to Wax Palms Growing In Sight of Snow

WAX palms, that now wave their 200-foot tops above the 10,000-foot Quindio Pass in the equatorial Andes, may presently grace the parks of Pacific Coast cities from San Diego to Grays Harbor, Wash.

Similarity in climate between the South American highland and the North American coastal strip offers this possibility, says Dr. Miriam L. Bomhard, botanist of the U. S. Forest Service, in the Annual Report of the Smithsonian Institution.

These palms, as Dr. Bomhard describes them, are among the most remarkable trees in the world. They are easily the tallest of all palms, their slender stately trunks lifting their feathery tops 200 feet or more into the air. When first discovered they were the tallest trees known.

They grow in the high Andes of northwestern South America, from Venezuela to southern Peru. The altitude of their habitat is never less than 4,000 feet and rises to 10,000 feet at Quindio Pass in Colombia, and to 13,000 feet on the Colombia-Ecuador border. It is cold country, within sight of perpetual snows on the lofty Andean peaks; not at all the kind of habitat commonly envisioned for palms. Some of the species regularly endure temperatures below freezing.

The tree is known as the wax palm because the trunk is covered with a coating of wax, which travelers have described as giving it the appearance of a towering pillar of alabaster. Natives scrape this off and use it for candles and matches. It burns with a clear white flame.

There are several distinct species of wax palms, one of them bearing the name *Beethovenia,* in honor of the great German composer. Each species has its own peculiar range of altitude and climate preferences.

Science News Letter, December 18, 1937

DENTISTRY

Pulling Wisdom Teeth Urged As Aid in Preventing Cancer

Dental Meeting Also Discusses Methods For Saving Teeth, Prevention of Pyorrhea, Surgery for Abscess

EXTRACTION of wisdom teeth as an aid in preventing cancer was urged by Dr. Douglas Quick of Cancer Memorial Hospital at the Greater New York Dental Meeting.

The area back of the wisdom tooth, technically known as the third molar, is one of the most frequent cancer sites in the mouth, Dr. Quick said. The position of the tooth makes it difficult to clean and the patch of mucous membrane just back of it is likely to become swollen and inflamed and the constant irritation may lead to cancer.

When there is any question in the dentist's mind about removing this tooth, Dr. Quick believes the decision should be for removal.

By watching for other conditions that can lead to cancer, such as jagged teeth and badly fitting plates, or false teeth, the dentist can do much to help prevent cancer, Dr. Quick pointed out. One outstanding tooth where the teeth next to it are missing can also be a source of irritation that may lead to cancer. Plates must be changed as the shape of the mouth and jaws changes with advancing years in order to avoid irritation. Pyorrhea and chronic infections in the mouth and especially around the gums add to the cancer hazard.

Some persons are much more susceptible to the irritation of tobacco smoke than others, Dr. Quick said. A distinction should be made between the danger of smoking and the danger of excessive smoking. It is the latter particularly which increases the cancer hazard.

Could Save Half

More than half the teeth extracted after the age of 50 years, and nearly half of those pulled before 50, could be saved, Dr. Grace Rogers Spalding of Birmingham, Mich., told fellow dentists. The saving of teeth could be accomplished, she indicated, by paying attention to diseases of the gums and structures that support the teeth.

Among the causes of these diseases Dr. Spalding listed inherited factors; defects of nutrition; outside chemical elements; physical force and energies; parasites (germs); social and psychological influences.

The inherited factors may cause abnormal arrangement, shape and formation of the teeth. These cannot be prevented, perhaps, but they can and should be corrected promptly, Dr. Spalding pointed out. She advised massage of the gums by the patient to stimulate faulty circulation of blood such as is commonly found in these diseases.

Eating is also important in preventing the diseases that lead to loss of teeth. The teeth must be used to be healthy, and too soft foods do not give them enough use. Eating too much, too little, too fast or failing to eat a balanced diet are other possible causes of gum diseases which Dr. Spalding suggested the dentist should investigate and correct in each patient.

Should Go to Bed

Having a tooth pulled may seem a minor matter to people who pride themselves on their ruggedness. In case of difficult extractions, however, even these rugged individuals should be ordered to bed, Dr. Thomas Connor of Atlanta, Ga., said.

Dr. Connor did not refer specifically to President Roosevelt but some of his remarks were said to throw light on the difficulties which the President has been through recently with his infected tooth.

There is always some infection after these difficult extractions and shock "is more or less extensive," Dr. Connor said. He believes such patients need rest in bed in order to recuperate properly and to avoid a spread of the infection or other difficulties. He also advised that the dentist see them 24 or 48 hours after the extraction because at this time first evidence of undue infection can be detected.

Nervous patients are likely to go to bed after a tooth extraction without being told, but the patient who prides himself on being able to stand pain and who claims he cannot miss a day or two from business should be ordered to bed in spite of his protests, to avoid further complications.

Operations for Abscesses

Instead of pulling teeth in cases of abscesses, dentists were advised to operate and treat infected areas. A high degree of success with this method, with saving of the involved teeth, was reported by Dr. Ralph F. Sommer of the University of Michigan.

Complete regrowth of bone after the operation takes place in about ten months in areas of ordinary size, Dr. Sommer reported. It may be possible in future, he said, to hasten the regrowth or regeneration by bone powder implants, but at present this procedure is still in the experimental stage.

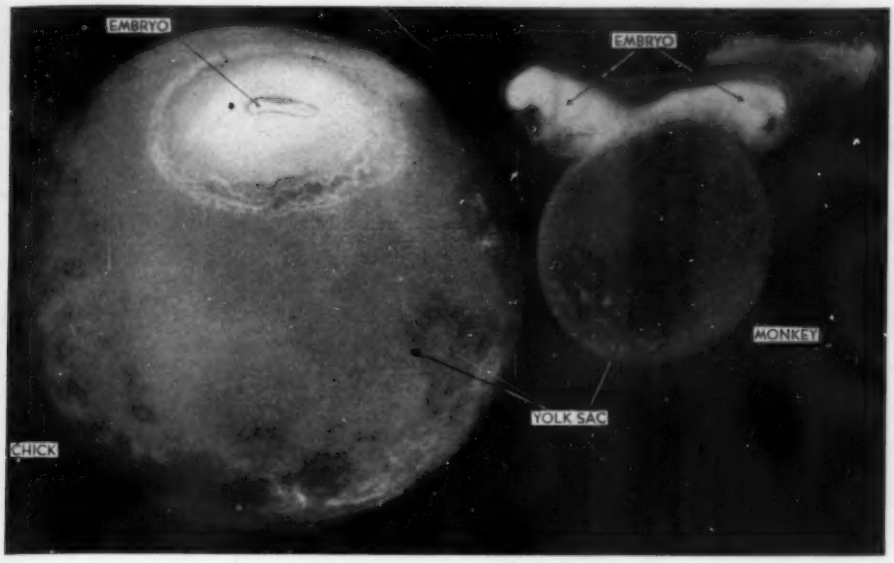
"The dental need of the people of this country is beyond comprehension," Dr. Sommer said in commenting on thousands of full mouth X-rays he has made annually during the last fifteen years on patients of all walks of life and from nearly every state of the Union.

Pyorrhea Prevented

Pyorrhea can be prevented by keeping the teeth in position so that the bite is normal, Dr. J. A. Loughry of Cleveland said. He added that dentists would come to be looked on as "real benefactors and not (*Turn to Page 398*)

OLDEST INHABITANT

Easily eligible for charter membership in an Association of Oldest Inhabitants is the long-departed jellyfish that left this imprint in beach sand that later hardened into a slab of rock in the Grand Canyon of Arizona.



YOLK-SACS COMPARED

Embryos of chick and monkey at comparable stages, as exhibited by the Carnegie Institution of Washington. The monkey embryo is shown as five times the size scale of the chick. The yolk sac of the latter is therefore enormously larger than that of the mammalian embryo.

PHYSIOLOGY—GEOLOGY—ASTRONOMY

X-Rays of Human Speech Shown at Carnegie Exhibit

Relic of the Most Ancient Animal Life and Pictures Taken Through the Interstellar Dust Also Shown

YOUR voice is muffled rather than reenforced by passing through your mouth. And in most voice sounds the supposed resonating cavities of the nose have no part at all.

These discoveries, at variance with what has always been believed about human voice production, were demonstrated at the annual exhibition of the research work of the Carnegie Institution of Washington. They represent the results of research conducted by Prof. G. Oscar Russell of Ohio State University under a grant from the Carnegie Corporation of New York.

X-rays made at the high-speed exposure rate of a hundred and twentieth of a second showed that practically all the sound of the voice is the direct production of the larynx. A flap of soft tissue cuts off the supposed "resonating" cavities of the nose altogether during most of the period of voice production, and the soft linings of the mouth cavity absorb some of the sound energy as it passes through.

Yolk Sac of Embryo

Another exhibit showed the rarely observed yolk sac in a very early stage of development of a monkey embryo. At this stage, future monkey and future man are practically indistinguishable.

The mammalian egg does not have a yolk composing a food reserve, as does the egg of a bird, but the yolk sac is there none the less. It is not simply a useless vestige left behind in the evolutionary process, but serves an important function in the making of blood for the developing young animal.

Most Ancient Animal Life

One of the earliest known remains of animal life on earth was shown. It consists of a slab of sandstone containing an excellently preserved imprint of a jellyfish that lived in pre-Cambrian time, more than 600,000,000 years ago. This fossil was found by Dr. N. E. A. Hinds of the University of California, a research associate of the Carnegie Institution, in the Grand Canyon of Arizona.

The jellyfish drifted ashore and died when the rocks near the bottom of the Canyon were soft sand of an ancient sea beach. There was no skeleton to preserve, but the imprint left on the sand, covered by other sand washed in by the next tide, was left undisturbed while it hardened into rock and was covered deeper and deeper. Later geologic processes resulted in the cutting of the Canyon and the resurrection of the jellyfish.

Dust Between the Stars

The universe may still contain as much of chaos as it does of cosmos. Studies at the Mount Wilson Observatory, to be made the subject of one of the exhibits, indicate that there are vast quantities of unorganized matter still drifting about as dust in the spaces between the stars.

This interstellar dust gets in the way of light rays, as does smoke or fog, and thereby obscures the vision of astronomers studying distant star clusters and galaxies. Recently this handicap has been partly overcome through the use of photographic plates sensitive to infrared rays, which have shown clearly the structure of star clusters that have been invisible or only faintly visible to previously used types of plates.

The physical behavior of radiations passing through these masses of space-dust leads to the inference that the average diameter of the particles must be close to one ten-thousandth of a millimeter, or a quarter-millionth of an inch.

Science News Letter, December 18, 1937

CHEMISTRY

Germans Marketing Soap Made From Coal Fat

NOW on sale in Germany is soap made from fat that comes from German coal. Large scale production of this soap is reported by *Industrial and Engineering Chemistry*, technical journal of the American Chemical Society.

The "coal" soap, as it may be called, is slightly higher in price than soap made from animal or plant fats but the scarcity of the natural fats lends economic significance to the development. Large scale production, it is hoped, may cut costs so that the new soap can sell at normal price levels.

Science News Letter, December 18, 1937

PHYSIOLOGY

Hang-Over May Be Due To Too Much Potassium

A HANG-OVER may be due to too much of a chemical called potassium getting into the blood, it appears from the report of Drs. William M. Nicholson and Haywood M. Taylor of Duke University School of Medicine to the Southern Medical Association. The potassium does not come from the alcohol but its excretion from the body is checked by the alcohol's action on the kidneys.

Tests were made of blood and other body fluids of a group of student volunteers who were given a special diet for three days and then given enough alcohol to get drunk. Potassium, the doctors found, was not excreted in anything like normal amounts after the alcoholic intoxication, and there was a greater than normal amount of potassium in the blood.

It has been known for some time that potassium is toxic if an excess is present in the fluid part of the blood. Shock, auto-intoxication and fatigue are associated with a high content of potassium in the blood.

Retention of potassium, the physicians reported, is brought about by direct action of alcohol on the kidneys. They suggest that some of the after-effects of alcoholic intoxication are due to an excess of potassium.

Salt and water were also retained after intoxication, but there was no change in the amount of sugar in the blood. An increase in lactic acid and a slight decrease in carbon dioxide content of the blood were found.

Science News Letter, December 18, 1937

LANGUAGE

Auxiliary World Language Is Goal of Investigation

RADIO and telephone allow our speech to circle the globe. Airmails carry messages quickly to far corners of the earth and even where wars rage the postal system delivers with high reliability the written word.

The mechanical world has developed a high degree of internationalism.

The greatest barriers to the interchange of thought, ideas and information are the many languages of the world. In Europe alone there are no less than 120 languages, all mutually unintelligible, and 38 of these are used by more than a million people.

Intelligent men and women are silently helpless when they lack a common tongue. The world would be better off if there were just one language. Obviously that can not be achieved.

But it does seem possible that educated persons might learn enough of an international auxiliary language to be able to talk or communicate intelligently, regardless of what natural languages they might happen to use in everyday affairs. This is no new idea and some 323 constructed or synthetic languages have been devised, only six of which have gained much following: Esperanto, Latino sine flexione, Ido, Occidental, Nov-Esperanto and Novial.

The problem before the world is to achieve one synthetic language that somehow can be established in an authoritative and permanent way. This is a world undertaking of the first rank, but one that will require much research and education before it can be accomplished.

Happily an unpublicized approach is being made by the International Auxiliary Language Association that had its origins in action by the International Research Council. Linguists and other scientists are digging into the difficult task of finding the best possible constructed language. When it is found, the question of getting the world to use it will be faced.

Science News Letter, December 18, 1937

PALEONTOLOGY

Dinosaur Tracks Found Near Gettysburg Site

GETTYSBURG battlefield, where the Blue and Gray hosts surged to battle, was tramped over by primitive dinosaurs 180 million years ago. Their tracks, indicating that they were two-legged beasts about the size of human beings, were discovered near the famous Civil War site in the course of quarrying stone for a bridge.

Slabs of the shale rock containing the tracks have been taken to the Smithsonian Institution and are being studied by staff paleontologists.

The shale formation in which the ancient prints were found is of Triassic age, the earliest of the three great geologic periods when reptiles ruled the earth. Early dinosaurs were not nearly so large as those appearing later; the largest footprints found at the Gettysburg site are only about six inches long, with a stride of about thirty inches. Other, smaller tracks indicate that some of the dinosaurs were no bigger than chickens.

Science News Letter, December 18, 1937

IN SCIENCE

SEISMOLOGY

Earthquakes Shake China And Caribbean Sea

WHILE war racked the north of China, an earthquake shook the country in its tropical southern section, records collected telegraphically by Science Service indicate. As interpreted by seismologists of the U. S. Coast and Geodetic Survey, the quake occurred on Dec. 8 at 3:32.4 a. m., eastern standard time. The epicenter was located near the eastern coast, northwest of the Japanese-held island of Formosa, in the general region of latitude 26 degrees north, longitude 119 east.

Another earthquake also occurred on the preceding day, Dec. 7, at 9:25.2 p. m., eastern standard time, at the bottom of the Caribbean Sea near the coast of Nicaragua. The epicenter was in the general region of 13.5 degrees north latitude, 82.5 degrees west longitude. The shock was described as only moderate, in contrast to the sharpness of the Chinese earthquake.

Stations reporting were those of the Jesuit Seismological Association at Canisius College, Buffalo, N. Y., and St. Louis University, St. Louis, Mo., and of the U. S. Coast and Geodetic Survey at San Juan, P. R., Sitka, Alaska, Honolulu, T. H., and Washington, D. C.

Science News Letter, December 18, 1937

CHEMISTRY

New Hungarian Product Ends Teary-Eyed Task

TEARY-eyed housewives peeling onions will welcome reports of a new Hungarian onion flour which gives a non-crying substitute for the lacrimose vegetable.

The technical journal of the American Chemical Society (*Industrial and Engineering Chemistry,* Nov. 20) reports a new method in which onion flour is mixed with gelatin to form a thick pulp. Salt, fat, palm grease or tallow is then added to facilitate the use of the new product in water. The non-crying onion substitute is sold in the form of lumps, balls or cubes.

Science News Letter, December 18, 1937

NE FIELDS

ZOOLOGY

Afraid of Turkey Hash? Here's an Elk That Isn't!

HERE'S a post-Thanksgiving story, from a remote ranger station. The teller is Mrs. Marguerite L. Arnold, ranger's wife:

"Mom," an old cow elk, has been accustomed to hang around the ranger station in late fall and through the winter, feeding on hand-outs of vegetable peelings, cold pancakes, and similar tidbits.

The evening after a big Thanksgiving dinner the stripped remains of the turkey were placed outdoors, as a treat for one of the half-tame coyotes in the neighborhood. Next morning the skeleton was gone, but nearby was "Mom" chewing on something.

On closer observation the something was found to be the turkey's breastbone. What had become of the rest of the bones could easily be guessed.

Whether "Mom" was the culprit in the Mystery of the Missing Ice Cream is not known. But considering her record in the matter of the turkey subjects her to suspicion.

A half-full tub of ice cream had been set in a snowdrift near the door, buried entirely in the snow. Next morning the snow had been pawed away, the lid removed, and every bit of the ice cream licked out without even upsetting the tub!

Science News Letter, December 18, 1937

ARCHAEOLOGY

Jacob of Bible May Have Been Adopted

BABYLONIAN writings offer new light on a curious Bible story.

The story is that of Jacob, who went visiting his Uncle Laban; stayed 20 years; married Uncle Laban's daughters, Leah and Rachel; and finally left secretly with wives, 12 sons, and cattle to start life for himself. Hot arguments and shifty dealings between Jacob and Laban in those 20 years have puzzled many a Bible scholar.

Now, on a clay tablet unearthed at Nuzi, Mesopotamia, are discovered similar situations, in connection with an adopted son. Hence, the new theory, that Jacob was adopted by his Uncle Laban. Dr. Cyrus H. Gordon reports this theory to the American Schools of Oriental Research. It clears up many points in the Bible story.

If Laban indeed held Jacob as a son, that accounts for Laban's angry claim: "The daughters are my daughters, and the sons are my sons, and the flocks are my flocks, and whatever thou seest is mine."

In just this way, a patriarch would expect to control a son, adopted or otherwise; but not a mere son-in-law.

Why Rachel daringly stole the family gods on leaving Laban's home is also clearer. The Babylonian text is a contract for a man to adopt a son. It provides that if a real son is later born, both boys share inheritance, but the real son gets the father's gods. Otherwise, the adopted son may have them.

Dr. Gordon points out Bible similarities: Whoever possessed the treasured idols apparently held title to the chief inheritance portion and leadership of the family. Laban seemingly had no sons when Jacob came, but later his sons are mentioned and to one of these sons would belong the father's gods. Rachel, however, wanted her Jacob to have the gods, and her plot succeeded.

Science News Letter, December 18, 1937

RADIO

Radio Dial Shows Stations On Map

AN INGENIOUS radio tuning dial on which radio stations are shown in their proper location on a map has been patented in the United States by an Italian inventor.

Stations are shown on a map by dots. To each dot is connected a horizontal line which projects across the map to bring it into line with a regular tuning scale which runs across the bottom of the map. The projections are made necessary by the fact that stations are not assigned frequencies in order of geographical location.

The radio user, Inventor Umberto Quintavalle of Milan, Italy, explains, picks the town to which he wishes to listen by looking at the map and turns the radio tuning knob until an indicator is at the end of the line representing the desired station.

Fabbrica Italiana Magneti Marelli Soc. An. of Milan is the assignee of the patent, No. 2,100,453.

Science News Letter, December 18, 1937

BOTANY-PHYSICS

Luminous Living Leaves Will Light World's Fair

LUMINOUS living leaves will shed soft light along the broad central avenue of the New York World's Fair in 1939. Reflected in the mirror pools, they will yield illumination unique in the history of great fairs.

It all depends on the fact that parts of the under surfaces of green leaves fluoresce, or shine with a gentle greenish-white light, when they are irradiated with certain wavelengths in the high-violet and ultraviolet. Special mercury vapor lamps have been devised to throw their rays upward into the maples, elms, and flowering dogwoods that have already been transplanted to the World's Fair site.

Science News Letter, December 18, 1937

CONSERVATION

Corn Favorite Grain of Game Birds and Animals

WHEN severe winter weather makes it necessary for game birds and animals to accept grain at the hands of man, they prefer corn to anything else, studies at the University of Wisconsin have shown. The investigations were conducted by A. S. Hawkins, E. B. Moore, and Aldo Leopold.

So fond are some of the animals of corn that special precautions have to be taken to prevent its waste. Squirrels will carry off whole ears; to prevent this, it is recommended that the cobs be impaled on spikes well above the ground level. It is a good idea to have the grain well off the ground in any case, the investigators recommend, so that it will be above snow level when the wild creatures need it most. Just leaving the grain in shock is one simple and effective way of taking care of the matter.

Wildlife needs but little grain to supplement the natural foods which the birds and animals find for themselves. One-seventh of an acre of corn is enough for the game population of an average farm.

During a week of severe winter weather, two pounds of grain will suffice as supplementary rations for a pheasant or a squirrel. Prairie chicken and rabbit require only half this quantity, and Hungarian partridge somewhat less—about twelve ounces. Quail need only half a pound of grain per bird per week of hard winter.

Science News Letter, December 18, 1937

METEOROLOGY

No Two Alike

Snowflakes, Falling in Such Countless Numbers, Have Never Produced Duplicates in All the Winters

By DR. FRANK THONE

See Front Cover

SNOW has such untellable beauty, as it sifts down from gray clouds, or lies glistening under the morning sun after the storm, that we almost forgive the roughness of Winter, since he comes with such a gift. Remote still are the February days when we shall think it burdensome; at first snowfall the white flakes are words of silent poetry, marvellous in their likeness one to another, yet infinite in their variety.

From the viewpoint of sober science no less than through one's esthetic eye, the tiny crystals of ice that we call snow are exactly that—marvellously alike, yet infinitely different. Many thousands have examined snow crystals with magnifying-glasses, and some few patient souls have slid them under microscopes and obtained permanent photographic records of their forms. But nobody yet has ever seen or photographed a snow crystal that was an exact twin of another snow crystal.

It is entirely legitimate to suppose that in all the snows that have fallen through all the thousands of winters this old world has known there have never been two snow crystals that were exactly alike.

No Proof

To be sure, it is not very likely that anybody will ever undertake to make rigid proof of the truth or falsity of that assumption. The numerical chances, on a statistical basis, could be expressed in figures vaster than those the astronomers use—so vast they would have no meaning.

And to test the matter experimentally, by photographing great numbers of snow crystals and comparing their pictures, would be a task of many lifetimes. The late W. A. Bentley, solitary Vermont genius who devoted all his winters to snow-crystal photography, was able to accumulate only a few thousand plates he considered worth keeping.

To be sure, Mr. Bentley was not concerned about hunting duplicate snow crystals. He just liked to photograph perfect specimens when he could find them, and he has left a monument to his memory in the book, Snow Crystals, which he produced in collaboration with Prof. W. J. Humphreys of the U. S. Weather Bureau. But among the many hundreds of pictures in this book and in all the other negatives that were not used in its production, duplicates simply cannot be found.

"Good" Storm Needed

If you want to try the game of snow-crystal hunting (all you need is a dark coatsleeve and a good pocket lens) you will soon discover that not every snowstorm yields good specimens. The heavy, wet snow that sometimes falls, mixed with rain often as not, will disappoint you. Its big flakes are made up of whole masses of individual crystals all matted together and already half melted. The opposite kind of storm, the dry blizzard that drives the snow horizontally like bullets, tears the crystals to pieces and all you get are the fragments, often rolled into pellets by drifting along the ground.

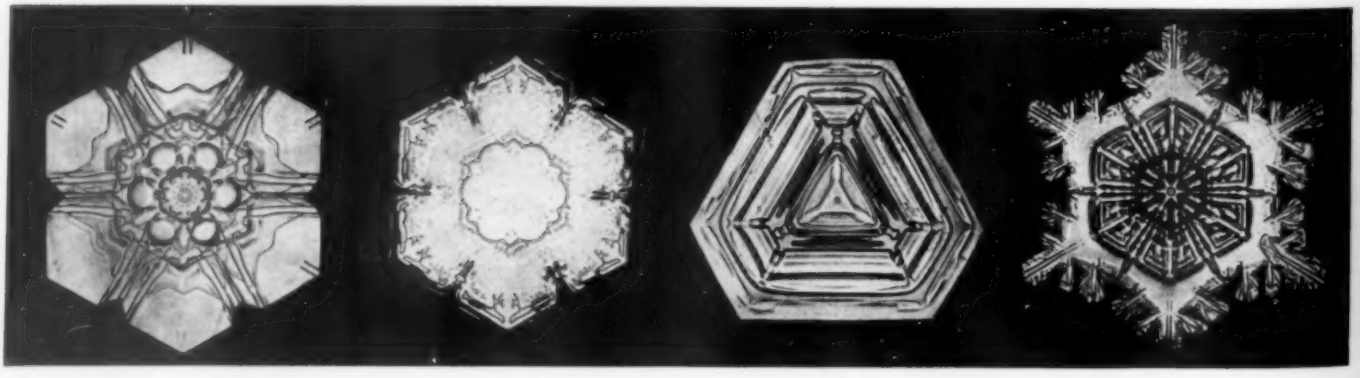
But the satisfactory, "in-between" kind of snowstorm will powder you with tiny flakes which on lens-examination show themselves as individual six-pointed crystals, or as a few of them loosely hooked together. Remember always to hold your breath as you peer through your magnifier; they will vanish like Cinderella's jewels if you let your animal warmth blow over them.

One thing will impress you quite early in your snow study—the wide range of pattern complexity. Some of the crystals are of a most severe simplicity, just six-sided little plates, almost as plain as the white hexagons in a tile floor. Others are six-pointed stars with spikes straight or but little branched. Others again are wonderfully complex, each of the six arms looking like a fairy feather or fernleaf.

Variety of Conditions

These pattern differences, the scientists say, are due to differences in the conditions under which the snow crystals formed. In general, the colder the air in which water vapor is condensing into snow crystals, the more slowly the crystals will form and the plainer their outlines will be. The fanciest, laciest, most fragile of the crystals are those formed most rapidly in air that is not very cold, and usually rather close to the ground.

Every snow crystal, like every raindrop, has to start with a nucleus of some sort—usually a microscopically tiny dust grain. On the electrically charged surface of this nucleus the first thin layer of water molecules condenses and freezes. Other molecules add themselves, millions of them. The three atoms in each one of them—two hydrogens, one



oxygen—so orient themselves with respect to the other water molecules that a six-sided arrangement results. This has been shown by X-ray studies on ice. And this minute hexagonal pattern, far beyond the range of any possible microscope, determines the six-sided shape of the relatively enormous snow crystal.

Earthbound Snow

The same condensation and crystallization of water on solid surfaces manifests itself at ground level as various forms of frost. Frost might almost be described as earthbound snow. Windowpanes in old-fashioned houses, that were not too well warmed at night when the fire in the heating-stove went out, offered ideal condensation surfaces. Leaves on the ground, on foggy autumn nights that turn sharply chill, are apt to be rimmed with rime in the morning—silver patterns that might have driven Cellini mad with envy.

The ice that forms on trees and telephone wires during one type of winter storm, however, has a wholly different history. Frost, rime, the fairy forest on the windowpane, come from the condensation of water vapor in the air directly into ice crystals. The coating of sleet ("glaze" is a better, more accurate term) on branches and wires is formed from liquid water—rain falling onto solid objects that are colder than the freezing-point of water. Sleet, properly speaking, consists of solid little pellets of clear ice, which are simply raindrops frozen by passing through a layer of cold air as they fall.

But to get back to our snow crystals: Another thing you will notice, if you look at all carefully, is that not only are there no duplicates, but even the parts of the individual flake are not exactly alike. There is often a tendency for three of the points to be emphasized more than the other three. This reaches an extreme in some flakes that are almost triangles.

Furthermore, there is no exact symmetry in any part. Each side, or point, or arm of the six-sided figure has some little individual marking or a deviation that saves it from a dead mechanical exactness. Crystals in general display this paradox of following a pattern yet not following it absolutely and slavishly—a hint of the unpredictability of behavior that we find in living things.

Your snow crystal is not only different from all others of its kind, and different internally among its own parts, it is not the same from moment to moment. Like a living organism, it is constantly either adding to or subtracting from its substance, constantly changing its form. You will not be able to see this in the short time you have it under your lens, but it is so nevertheless.

Lost Substance

We have seen how the crystal was born and grew through the process of water-vapor condensation around an original nucleus. So long as there is more water vapor present to feed it, and its temperature and other conditions remain suitable, it will continue to grow. If it becomes too warm, of course, it will begin to melt. But even in very cold air, if it is dry enough, the snow crystal (or any piece of ice, for that matter) loses some of its substance. The molecules of which it is composed escape directly from the solid state into the air as water vapor. This change from solid to vapor without passing through a liquid state is called sublimation. It goes on constantly and rather rapidly when snow or ice is exposed to dry air. Many other substances besides ice can be sublimated.

We commonly think of massive ice as something that is formed by the direct freezing of large quantities of water. The thick coating over our rivers in the North, the tremendous blocks that pile up along the shores of the Great Lakes, make vivid impress on our imaginations.

Yet the mightiest masses of ice on earth, the glaciers of high mountains and the ice caps of Greenland and Antarctica, were not formed from liquid water at all but from the packing, partial melting, and re-freezing of snow. So it was also in the earth's great Ice Ages, when vast sheets of ice a mile or more thick lay for tens of thousands of years over whole continents. Wherever snow lies unmelted the whole summer through, and survives season after season with constant additions of more snow in the winters, it will eventually pack down into solid ice. And if there is slope enough the ice field will begin to move—and you have a glacier.

If you like to juggle big figures, try to estimate how many individual snow crystals it would take to make a pint (a pound) of water. Then figure how many pounds in an ordinary iceburg—say one as big as an average office building. Then recall that that iceberg was just a little piece of the end of a glacier several miles long. Then extend your glacier over the whole of North America as far south as the Ohio river and over the Old World down to the Alps, and pile it up a mile thick.

How Many?

How many separate snow crystals to make a whole Ice Age? You'll have to do your figuring in billions to the billionth power! Yet that's how Ice Ages happen.

When you get back from that excursion into the astounding, consider a humbler, more familiar paradox of snow: it is made of ice, yet it can keep things warm. Temperatures under a snow

COUNTLESS FORMS

Like lace made in fairyland are the patterns of snowflakes. Catch one on a dark coat sleeve and look at it through a magnifying glass. But hold your breath or it will vanish like Cinderella's jewels.

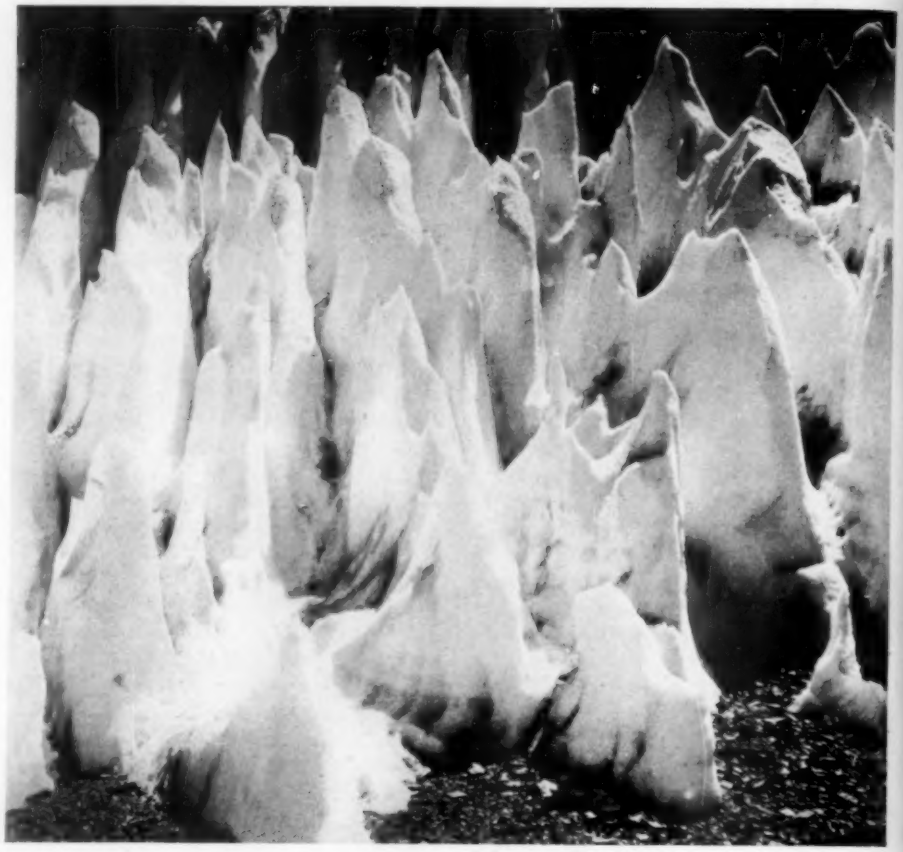
cover, even in zero weather, are appreciably higher than they are up in the wind. The mountaineer in his snow-buried hut, the Eskimo in his snow-block igloo, don't worry so long as they have something to keep up a bit of fire. The snow, caging quantities of air between its fluffy flakes, is an excellent heat insulator—less durable than asbestos or felt, but of a comparable order of efficiency.

Protects Plants

Snow's function in protecting plants in winter is not so much in keeping them warm as in preventing too rapid fluctuations between freezing and thawing, which is very damaging to plants, and also in shielding them from dry, cold winds that might deprive them of vitally necessary water. Winter drought can be the cruellest drought. Farmers with winter wheat in their fields worry when the snow cover disappears, even though the temperature may not be severe. But the mercury can drop to fifty below zero, for all they care, if the crop is safely blanketed under a foot or so of snow.

This article was edited from manuscript prepared by Science Service for use in illustrated newspaper magazines. Copyright, 1937, by Every-Week Magazine and Science Service.

Science News Letter, December 18, 1937



PENITENTIAL SNOW

"Nieve penitente" is often found in mountain regions. Unequal melting leaves steep mounds that look like white-robed figures bowed in prayer.

PUBLIC HEALTH

Possibility of Parrot Fever Vaccination in Mouse Studies

PROTECTIVE vaccination against parrot fever or psittacosis might be possible in the future by using parrot fever virus made inactive by formalin, it appears from studies reported by Dr. K. F. Meyer, of the University of California's George William Hooper Foundation, at the meeting of the American Society of Tropical Medicine.

Three injections of a specially prepared vaccine, Dr. Meyer reported, protected 90 per cent. of a group of mice against deadly doses of parrot fever virus.

Resistance to parrot fever is extremely variable and difficult to understand, it appears from Dr. Meyer's report. An attack of the disease does not always protect against a second attack. Two cases of second attacks have been reported in laboratory workers. Children have a definite resistance to parrot fever, which seems to get less as they grow older. Bird breeders are supposed to be immune to the disease but probably are not. Investigation showed that they often are sick with a malady like influenza which Dr. Meyer believes really is parrot fever. The symptoms of the two diseases are so much alike that parrot fever has probably often masqueraded as influenza.

Not all those exposed to the disease get it. One member of a family may die from parrot fever caught from a pet bird and others of the same family hardly seem to be ill. On the other hand, the disease has occurred in laboratory personnel when every effort was made to protect them from it during parrot fever investigations.

Science News Letter, December 18, 1937

A botanist observes that poison ivy was very little used by Indians, but tribes in Iowa did use it to poultice some kinds of swellings.

SEASICKNESS
Why Bring That Up?
By Dr. Joseph Franklin Montague
What to do about Seasickness
$2 142 Pages ● Illustrated ● Helpful ● Humorous ● and AUTHORITATIVE
Home Health Library, Inc.
516 Fifth Avenue, New York City
SEASICKNESS

Books

SCIENCE NEWS LETTER will obtain for you any American book or magazine in print. Send check or money order to cover regular retail price ($5 if price is unknown, change to be remitted) and we will pay postage in the United States. When publications are free, send 10c for handling.

Address Book Department

SCIENCE NEWS LETTER
2101 Constitution Ave. Washington, D. C.

AGRICULTURE

Rust Brothers Change Original Plan to Lease Cotton-Pickers

THE RUST brothers, idealistic southerners who are almost ready to begin manufacture of their widely-heralded cotton-picker, have dropped their original plan to lease the machines and will now sell them outright.

Although no definite information could be secured as to the reason underlying the change in plans in connection with the cotton-picker, which promises to create an economic revolution if and when introduced into the South, it is believed that one of two factors or both may have induced the brothers to drop their intention of limiting its use.

Two rival cotton-pickers are being developed, one by the Berry-Gamble-Haneur interests and the other by the International Harvester Company. With two competing pickers on the market, no leasing scheme would be workable.

Although larger profits can be made in the long run in many fields by leasing machinery rather than selling it outright, capital necessary for expansion in the early days of manufacture can be most quickly secured by immediate sale.

Unusual interest has been attached to the development of a successful cotton-picker, because its widespread use would directly result in profound disturbances to the labor market throughout the South. Cotton-picking is virtually entirely a hand operation employing hundreds of thousands of men and women for forty days a year. Even though use of the machine may not mean permanent unemployment for the farmhands and sharecroppers, it will mean a temporary displacement of uncomfortable dimensions.

Realizing this, the Rust brothers, John D. and Mack D., at first proposed to limit its use in the United States so as to minimize its effects. They also turned the patents on their device over to the Rust Foundation, a non-profit corporation which will receive the lion's share of profits and will devote them toward educational and cooperative development purposes. That part of the plan, they declare, has not been changed.

Patent No. 2,101,100, covering additional features of their famous cotton-picker, has been awarded the Rust Brothers.

Improvements in the machine to enable the wheels on which the machine runs to supply power for turning the cotton-picking spindles are covered by the patent.

More flexible controls to enable the operator to follow more closely the contour of the bushes are also among the refinements featured in the patent.

Science News Letter, December 18, 1937

CHEMISTRY

Combustible Phosphorus Made On Large Scale by New Method

PHOSPHORUS, the chemical element which bursts into flame when exposed to air, is now being produced, and shipped, in tank car lots to open up a new field of chemical industry.

This achievement is being hailed as one of the outstanding chemical industrial developments of the year. It was recognized by the presentation of the Chemical and Metallurgical Engineering award to the Monsanto Chemical Company for this development.

Elemental phosphorus has long interested scientists. Its spontaneous burning is fascinating as well as dangerous. Because it ignites easily and glows in the dark, the ancient alchemists named the element phosphorus mirabilis—"miraculous bearer of light."

In life and death, peace and war, industry and agriculture, phosphorus is an element interwoven with modern civilization. When you eat cakes or other bakery products made with baking powder, the action of phosphorus is entering your existence. When you strike a match the sparks and flame come from the phosphorus present. There is phosphorus in your bones and those of any animal. And the farmer requires phosphorus fertilizer to replenish his soil so that crops will grow. In war—in the air, on the ground or on the oceans—phosphorus comes into its own as the creator of dense smoke screens which shield a military force from its enemies. Deadly poisons—used commercially to exterminate rats—contain phosphorus.

For years the phosphorus in animal bones was the principal source of the strange element. But gradually it was found that by heat-treatment the phosphorus in certain rocks could be removed as a vapor and condensed under water to yield the waxy-colored element.

The newer way, and the method for which the Monsanto Chemical Company received the current award, is to obtain

THE GIFT OF A THOUSAND THRILLS

Filmo MOVIE CAMERA

A thrill to receive . . . a new thrill every time it is used to record happy times for reliving. All this you give with this palm-size Filmo Movie Camera. Built with the same precision as the finest Bell & Howell professional equipment Hollywood demands. Simple . . . anyone can take fine color or black-and-white movies because *what you see, you get.* Uses inexpensive 8 millimeter film, reducing the cost of movies to still-picture level. Has fine anastigmatic F 3.5 lens for indoor as well as outdoor movies.

$55 AS LITTLE AS $11 DOWN

PAUL L. BRAND

Distributor of
Scientific Instruments
1808 EYE STREET, N. W.
Washington, D. C.

the phosphorus with the heat of an electric furnace.

Sand, rock containing calcium phosphorus, and coke are fed into the electric furnace. In the high temperature of the carbon arc (6,620 degrees Fahrenheit) the three raw products react to create carbon monoxide and elemental phosphorus in the form of a vapor. Because the phosphorus readily and dangerously combines with air, the whole industrial operation must be carried out under reduced pressure or else in a vapor of hydrogen or nitrogen. Purification of the phosphorus vapor condensed under water can be accomplished by melting the element and stirring it. Or certain oxidizing agents like potash can be used to remove impurities.

With the air still excluded, the purified phosphorus can be sealed in steel drums or even tank cars and shipped.

Science News Letter, December 18, 1937

From Page 390

just necessary evils" if they admitted that, with the full cooperation of the patient, pyorrhea and loss of teeth is not necessary and tooth decay can be kept to a minimum.

Dr. Loughry stressed the importance of replacing lost teeth. Sometimes it is necessary to extract some remaining teeth in order to secure a normal bite. The teeth, he explained, work in relation to each other. If even one is missing the whole chewing system is thrown off balance. All the teeth should be used evenly in order to exercise the gums and thus stimulate the supply of blood to gums and teeth. When there is a good blood supply, the teeth and gums are more resistant to decay, infection and other injurious agents.

Jawbone Disease Masquerades

Many cases of pain that appears due to sinus or ear trouble may be due to disease of the lower jawbone, Dr. James B. Costen of Washington University School of Medicine at St. Louis explained.

Among the symptoms traced to this jaw condition are burning tongue, dizziness, deafness, stuffy sensation within the ear, buzzing and grating noises, dull pain within the ears and sinus-like pain. Gnashing of the teeth or partial lockjaw is a serious handicap to successful treatment, and if measurements for artificial teeth are made while this symptom is present, there is apt to be a relapse of the original condition.

Science News Letter, December 18, 1937

MEDICINE

Unethical Not to Patent Medical Discoveries

"IT IS unethical not to patent medical inventions," Arthur G. Connolly, patent attorney of Wilmington, Del., declares in the leading article in the scientific journal, *Science*. (Oct. 29)

The reasons for this conclusion, which Mr. Connolly himself points out may startle many persons, are the following:

1. Even if a physician refrains from patenting a medical invention and merely reports it in a medical journal, he does not necessarily prevent others from patenting it.

2. If the invention is patented by others, it may be developed in a way that will harm the public.

3. If the invention is not patented, there can be very little control over the quality of the product or of the price at which it is sold.

The physician who wishes his invention to be of greatest service to the public will achieve that end best, Mr. Connolly believes, by patenting his invention and then developing the patent for the public benefit.

Mr. Connolly suggests that it would be helpful for the medical profession to establish a central committee which would protect by patents the inventions of the profession. This same committee could develop the patents so as to safeguard the interests of both public and physicians.

This suggestion is somewhat similar to the proposal recently made by Dr. Morris Fishbein, editor of the Journal of the American Medical Association, that that medical association might organize a non-profit holding corporation to administer patents in the medical and health fields.

Science News Letter, December 18, 1937

PUBLIC HEALTH

Climate May Play Part In Infantile Paralysis Immunity

THE VIRUS of infantile paralysis is widely scattered throughout the world, existing even in places where epidemics of the disease rarely occur, Drs. N. Paul Hudson and E. H. Lennette of Ohio State University and the University of Chicago reported to the American Society of Tropical Medicine.

Climate, it appears from their studies, may play a part in bringing about a natural immunity or resistance to the disease.

The two bacteriologists examined the blood of small groups of persons living in such widely separated places as Nashville, Tenn.; Liberia; Peiping, China; the Philippine Islands; inland Brazil; and Thursday Island, Australia. Most of these persons, at least four-fifths, had in their blood substances which could neutralize the virus of infantile paralysis. Presence of such neutralizing substances in the blood usually means that the person has previously had the disease or at least has gotten some of the virus into his system and has developed immunity or resistance to the disease. Consequently it appears that the virus of the disease is pretty widely scattered around the world.

Epidemics of infantile paralysis are uncommon in the regions in which Drs. Hudson and Lennette made their blood studies, although occasional sporadic cases occur, or the disease may be endemic, a few cases always occurring but with no epidemics.

Since most of these places are in the tropical or subtemperate zone, the two bacteriologists suggest that climate affects the relation between the virus and man. Man in these climates apparently can play host to the virus, which is a parasite, so that it does not die off, and at the same time is able to build up an immunity to it so that he rarely gets sick with infantile paralysis.

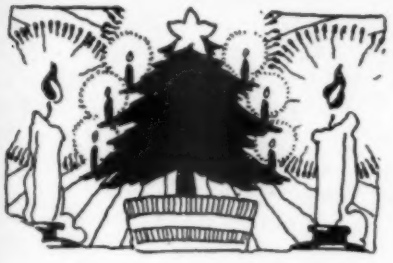
Science News Letter, December 18, 1937

The wild rooster, jungle forefather of domestic fowls, cannot crow so loudly as the barnyard cock.

CHRONOLOGY

NATURE RAMBLINGS

by Frank Thone



The Date of Christmas

CHRISTMAS comes on Dec. 25 because ancient pagans had a midwinter feast to celebrate the beginning of the sun's return northward after its southward journey that brought gloomy, short days and discouraging cold. Christianity, supplanting paganism, made the transition easier by setting the date of the midwinter feast as the traditional date of Christ's birth.

This connection between Christmas and the winter solstice is rather generally accepted; even the most orthodox of churchmen now freely state that there is no dependable record or tradition exactly dating the great event in Bethlehem, and that the Christmas celebration did not begin until about three centuries after Christ's time.

But an even more intimate connection, a closer parallel, between Christian teaching and pagan solar lore is traced by the Abbé Chauve-Bertrand of Nevers, France, well known for his studies on astronomical questions as relating to the evolution of the calendar. Ancient pagan religious observance even celebrated the birth of the "New Sun" from a celestial virgin.

This virgin of the skies was none other than the constellation Virgo, one of the twelve groups of stars comprising the Zodiac. During the harvest season, when the girls went forth into the fields to help in the reaping, Virgo stood high in the heavens, as the ruling constellation.

But by the time midwinter came, Virgo was just dipping beneath the horizon, so that the sun to issue forth from her bosom and to be cradled in her arms. Hence, says Abbé Chauve-Bertrand, the myth of the New Sun born of the Virgin. Pagan midwinter processions in Arabia and Egypt carried the image of the sun as a new-born child, while Priests chanted, "Korah, the Virgin, has given birth to Aion."

The sun cult was most strongly represented by Mithraism during the first Christian centuries, and Christian teachers argued from Mithraic analogies in establishing the supremacy of their religion. St. Ambrose called Christ "our New Sun," and St. Cyprian referred to him as the "True Sun." Even in the ancient Hebrew prophecies the coming of the Messiah was hailed as the advent of the "Sun of Justice."

Science News Letter, December 18, 1937

●RADIO

December 23, 4:15 p. m., E.S.T.
THE CHRISTMAS STAR—James Stokley of the Franklin Institute.

December 30, 4:15 p. m., E.S.T.
THE YEAR IN SCIENCE—Watson Davis, Director of Science Service.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

OCEANOGRAPHY

Diver Under 320 Tons Pressure at 420 Feet

MAX E. NOHL, diver, who descended to a depth of 420 feet in Lake Michigan recently, withstood a pressure on his body of 320 tons more at that depth than he did at the surface.

Atmospheric pressure of 15 pounds to the square inch adds up to about twelve tons when all the 3500 square inches of the average man's skin are considered. At 420 feet the pressure is about 197 pounds to the square inch.

Dissolved gases in the human blood stream and body cells enable us to resist the pressure of the atmosphere. At shallow depths, compressed air helps a diver to resist water pressure, but as the pressure increases, nitrogen from the air dissolves in the blood stream, causing trouble if the diver comes to the surface too rapidly.

"Bends," or caisson disease, a common and serious illness of divers, is caused by collecting nitrogen bubbles in the capillaries. These bubbles act as blood clots. Diver Nohl, to prevent this, used an atmosphere of oxygen and helium, which causes fewer bubbles in the capillaries on ascending to the surface.

JUST ISSUED

December 1, 1937

AUTOBIOGRAPHY OF ISAAC J. WISTAR

1827 - 1905

"When one not inordinately addicted to discoursing of himself begins to contemplate a lapse from such negative virtue . . ."

Isaac J. Wistar, who never confused modesty with self-repression, opens his autobiography in this forbidding, Victorian language. But he soon shifts to easily-written, easily-read narrative, reflecting Dana's "Two Years Before the Mast" in its salt-tanged sea tales; twinkling here and there with a roguish humor not unworthy of Mark Twain, his contemporary; and pausing at the end of blood-and-thunder passages for Wistar, the adventurer, to allow the scientific-minded Wistar to relate some wound treatment or psychological observation.

For Wistar lived through remarkable times and made the most of them. He traveled across the continent with the vanguard of the Forty-Niners in a journey almost epic in itself. He earned and lost small fortunes as a miner, trapper, muleteer, speculator, and lawyer before he was thirty, such was his versatility.

He killed Indians relentlessly when menaced; yet he considered creation of an Indian empire to halt encroachment of white settlers on the "rightful owners" of the land. He never hesitated to pistol, club, or butt anyone who crossed him; yet the Governor of California singled him out to suppress the Vigilante rioters of 1856. He stood armed to fight Abolitionists and believed ardently in State rights; yet his privately-raised regiment is credited with saving the Union at Gettysburg and in the Seven Days Battles.

All these seeming inconsistencies become an orderly part of the picture of the day in Isaac J. Wistar's forceful writing of his autobiography. It is the last word from a leader of a vanished American generation.

Pages viii + 528. Illustrated. Cloth, 8vo.

Price $5.00

Address orders to

THE WISTAR INSTITUTE OF ANATOMY AND BIOLOGY
Woodland Avenue and Thirty-sixth Street
Philadelphia, Pa.

•First Glances at New Books

Entomology

MOSAICS AND OTHER ANOMALIES AMONG ANTS—William Morton Wheeler—*Harvard Univ. Press,* 95 p., illus., $2. The late Prof. Wheeler has described many fascinating things he saw among ants during his many years of research on these insects, but probably none of the wonders of this little world are more astonishing than the ones described in this slender posthumous book. Ants that are in appearance half male and half female, or half sexed and half "neuter" workers, form only the beginning of the long array of fantastic monsters of the formicary.

Science News Letter, December 18, 1937

Psychology

INTRODUCTION TO CLINICAL PSYCHOLOGY FOR STUDENTS OF MEDICINE, PSYCHOLOGY AND NURSING—Edward M. Westburgh—*Blakiston's,* 330 p., $3.50. By the chief of psychological service of the Institute and of the Department of Mental and Nervous Diseases, Pennsylvania Hospital.

Science News Letter, December 18, 1937

Color—Juvenile

THE WONDERFUL WONDERS OF RED-YELLOW-BLUE—Faber Birren—*McFarlane, Warde, McFarlane,* 48 p., Colored illus., $2. All sorts of interesting facts about color are presented for children, with exciting and gay illustrations on every page.

Science News Letter, December 18, 1937

Child Care

HOW TO CARE FOR THE BABY—Violet Kelway Libby—*Bruce Humphries,* 110 p., $1. A practical booklet by a mother of three children. "This little booklet should help the mother find herself, and is an excellent supplement to the advice of the physician," Dr. Truman Abbe says in his foreword.

Science News Letter, December 18, 1937

Mortality Statistics

MORTALITY TRENDS IN THE STATE OF MINNESOTA—Calvin F. Schmid—*Univ. of Minnesota Press,* 325 p., charts and diagrams, $3.50. By the assistant professor of sociology at the University of Minnesota.

Science News Letter, December 18, 1937

Science Teaching

THE TEACHING OF PHYSICAL SCIENCES IN THE SECONDARY SCHOOLS OF THE UNITED STATES, FRANCE, AND SOVIET RUSSIA—Alexander Efron—*Teachers College, Columbia Univ.,* 296 p., $2.35. International comparisons which find richness and democracy in American schools, but lack of historical perspective and clear-cut educational philosophy.

Science News Letter, December 18, 1937

Physiology

THE HUMAN BODY (3rd ed.)—Logan Clendening—*Knopf,* 452 p., illus., $3.75. This new edition has been corrected, enlarged and rewritten by the author.

Science News Letter, December 18, 1937

Medicine

USEFUL DRUGS: A SELECTED LIST OF ESSENTIAL DRUGS (10th ed.)—Robert A. Hatcher, ed.—*Amer. Medical Assn.,* 240 p., 75 c.

Science News Letter, December 18, 1937

Child Care

CARE AND DIET OF CHILDREN; Questions Mothers Ask the Doctor—Harry S. Reynolds—*Fortuny's,* 154 p., $2. Written in simple language, by a pediatrician who is visiting physician to Manchester Memorial Hospital.

Science News Letter, December 18, 1937

Physiology

SEXUAL MATURATION AND THE PHYSICAL GROWTH OF GIRLS AGE SIX TO NINETEEN—Frank K. Shuttleworth—*Soc. for Research in Child Development, National Res. Council,* 253 p., $1.25.

Science News Letter, December 18, 1937

Medicine

LANE MEDICAL LECTURES; THE MECHANISM OF HEAT LOSS AND TEMPERATURE REGULATION—Eugene F. Du Bois—*Stanford Univ. Press,* 95 p., $1.50 paper, $2.50 cloth.

Science News Letter, December 18, 1937

Anthropology

CULTURE ELEMENT DISTRIBUTIONS: V. SOUTHERN CALIFORNIA—Philip Drucker—*Univ. California Press,* 51 p., map, 50 c.

Science News Letter, December 18, 1937

Medicine

GENERAL HYGIENE AND PREVENTIVE MEDICINE—John Weinzirl; Ed. by Adolph Weinzirl—*Lea & Febiger,* 424 p., $4. A text-book for college students, medical students, nurses, public health workers and social workers, which seems to be broader in scope than the usual hygiene textbook.

Science News Letter, December 18, 1937

Medicine

HANDBOOK OF THERAPY (11th ed.)—Morris Fishbein, ed.—*Amer. Medical Assn.,* 812 p., $2. For physicians.

Science News Letter, December 18, 1937

Photography

THE STREAMLINE TRAIN BOOK: A Photographic Picture-Book with a Story—William Clayton Pryor and Helen Sloman Pryor—*Harcourt, Brace,* 101 p., $1. Nancy and Ted ride on a streamlined train, and learn about how it runs. The pictures on every page show other children just what the new streamliners are like.

Science News Letter, December 18, 1937

Home Economics

A HANDBOOK OF FOOD PREPARATION—Susan F. West and Louise Sobye—*Macmillan,* 291 p., $2. By the Director of Home Economics and the Assistant Professor of Home Economics at the Milwaukee-Downer College, this laboratory manual is designed to supplement food texts for introductory college courses.

Science News Letter, December 18, 1937

Photography

PHOTO-MARKETS (7th ed.)—John P. Lyons—*Pub. by Photo-Markets, Inc.,* 153 p., 40c. Brought up to date, doubled in size, carefully indexed, reduced in price, this new edition tells how, when, where and what to submit.

Science News Letter, December 18, 1937

Conservation

AIDS TO THE STUDENT OF CONSERVATION—Stephen S. Visher—*Wiley,* 32 p., 25 c. Review questions, printed on tear-out pages, to go with Parkins and Whitaker: *Our Natural Resources and their Conservation.*

Science News Letter, December 18, 1937

Petroleum Technology

A. S. T. M. STANDARDS ON PETROLEUM PRODUCTS AND LUBRICANTS (1937 ed.)—*American Society for Testing Materials,* 385 p., $2.

Science News Letter, December 18, 1937

Economics

BOOKKEEPING FOR PERSONAL AND BUSINESS USE—Raymond V. Cradit—*American Technical Society,* 326 p., $2.25.

Science News Letter, December 18, 1937

Vocational Guidance

GUIDANCE FOR YOUTH (New ed.)—Frank G. Davis and B. Carnall Davis—*Ginn,* 387 p., $1.56. Agricultural, industrial, commercial and professional occupations are all described.

Science News Letter, December 18, 1937

Economics

SOCIAL SECURITY IN AMERICA—Committee on Economic Security, Social Security Board—*Govt. Print. Off.,* 592 p., tables, 75 c.

Science News Letter, December 18, 1937